ASSOCIATION OF
ENGINEERING GEOLOGISTS

"Serving Professionals in Engineering, Environmental and Ground Water Geology"

Short Course No. 7
NOTEBOOK

SEISMIC REFRACTION DATA INTERPRETATION FOR ENGINEERING AND ENVIRONMENTAL INVESTIGATIONS

34th ANNUAL MEETING
"Environmental and Geotechnical Challenges for the Decade"

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SEISMIC REFRACTION DATA INTERPRETATION

for Engineering and Environmental Investigations

Short Course No. 7

34th Annual AEG Meeting

by

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SEISMIC REFRACTION DATA INTERPRETATION

For Engineering and Environmental Site Investigators

SESSION 1 - DATA QUALITY AND FIRST ARRIVAL PICKING
THE MOST IMPORTANT STEP IN DATA INTERPRETATION

Lecture: Instrumentation and Field Procedures.
- Rise Time - Frequency Content - Sample Rates

Data Quality and Errors
- Time Breaks - Sources - Filtering

Errors and Ambiguity
- Precision vs Accuracy - Structure vs Velocity

Lab: First Arrival Picking Algorithms/Programs
- A review of picking algorithms in public domain and commercial software packages

Record Picking
- Good Data - Medium Data - Others

Evaluation of Errors
- Least - squares fits your picks.

SESSION 2 - SIMPLE INTERPRETATION
BASIC GRAPHICAL METHODS OF DATA INTERPRETATION
THE ASSUMPTIONS THAT ARE INHERENT IN THE METHODS

Lecture:

What is happening?
Why is Fermat's Principle more important than Snell's Law?
Derivations:
- Time Intercept - Reciprocal Time Methods
- Ambiguity - Apparent Velocities vs Real Thing
  - S-wave vs P-wave

Lab: Time-intercept Interpretation.
Manual Reciprocal Time-interpretation.

SESSION 3 - THE GENERALIZED RECIPROCAL METHOD (GRM)

Lecture: Problems with Refraction
GRM - Derivations and Opaque Concepts
v(t), XY, and Loci
Multiple Layers - Hidden Layers

Lab: GRM Interpretation
All Steps for a Simple Problem

SESSION 4 - ADVANCED REFRACTION TECHNIQUES
DESIGNING DATA ACQUISITION PROCEDURES FOR THE GEOLOGIC PROBLEM AS WELL AS THE INTERPRETATION METHOD.

Lecture: The Hidden Layer/Blind Zone Problem and How to Recognize it.
Field Design Procedures
Recognition of Problems
The Refraction Lament

Lab: GRM Interpretation
Solution of Problems
Trading Structure for Velocity
Two or Three Layers?